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METEOROLOGICAL SUMMARY FOR THE YEAR 1889.

PREPARED BY PROF. F. H. SNOW, OF THE UNIVERSITY OF KANSAS, FROM OBSERVATIONS TAKEN AT LAWRENCE.

The most notable meteorological features of the year 1889 were the remarkable absence of extremes of heat and cold, resulting in a very mild winter and a very cool summer; the abundant and well-distributed rainfall making this one of the three wettest years on our twenty-two years' record; the phenomenally warm December, whose mean temperature was six and one-half degrees above that of November; the low wind-velocity; the small amount of snow; and the unusual number of fogs, averaging a little more than two per month.

TEMPERATURE.

Mean temperature of the year, 53.57° , which is $.67^{\circ}$ above the mean of the 21 preceding years. The highest temperature was 94° , on July 8, the lowest was 3.5° below zero, on the 23d of February, giving a range of 97.5° . Mean at 7 A. M., 47.91° ; at 2 P. M., 61.67 ; at 9 P. M., 52.35° .

Mean temperature of the winter months, 34.22° , which is 5.43° above the average winter temperature; of the spring, 55.11° , which is 1.46° above the average; of the summer, 73.31° , which is 2.30° below the average; of the autumn, 51.66° , which is 1.90° below the average.

The warmest month of the year was July, with mean temperature 76° ; the warmest week was July 16 to 22, mean 79.19° ; the warmest day was July 7, mean 82.75° . The mercury reached or exceeded 90° on only 6 days (34 below the average number), all of which were in July. This is a most extraordinary deficiency of hot days, the smallest number of such days in any preceding years of our record having been 20, in 1877 and 1884.

The coldest month was February, with mean temperature 27.56° ; the coldest week was February 17 to 23, mean temperature 13.56° ; the coldest day was February 23, mean 5.50° above zero. The mercury fell below zero on only 4 days, all of which were in February.

The last hoar frost of spring was on May 3, the first hoar frost of autumn was on September 27, giving an interval of 147 days, or nearly five months, entirely without frost. This is eight days shorter than the average interval.

The last severe frost of spring was on March 28, the first severe frost of autumn was on October 27, giving an interval of 213 days, or exactly seven months, without severe frost. The average interval is 198 days. No frosts during spring or autumn caused damage to crops of grain and fruit, and for the first time in several years there was an abundant crop of peaches.

RAIN.

The entire rainfall, including melted snow, was 43.99 inches, which is 8.89 inches above the annual average. Either rain or snow, or both, in measurable quantities, fell on eighty-one days—twenty-one less than the average. On eleven other days rain or snow fell in quantity too small for measurement. The rain of the night of the 12th of August measured 5.68 inches, which surpasses any previous single rainfall on our record, the next to it being the 4 inches of June 13, 1876.

The number of thunder showers was 35. There were five light hail storms during the year—one in January, three in May, and one in June.

SNOW.

The entire depth of snow was only six inches, all of which fell in February. This is 15.96 inches below the average, and with the exception of the five inches in 1875, is the smallest annual snow precipitation on our record. Snow fell on 11 days, on 9 of which the quantity was too small for measurement. The last snow flurry of spring was on April 5th; the first snow flurry of autumn was on November 25th—17 days later than the average date.

FACE OF THE SKY.

The mean cloudiness of the year was 43.82 per cent., which is .3 per cent. below the average. The number of clear days (less than one-third cloudy) was 167; half clear (from one to two-thirds cloudy), 103; cloudy (more than two-thirds), 95. There were 87 days on which the cloudiness reached or exceeded 80 per cent. There were 60 entirely clear and 51 entirely cloudy days. The clearest month was August, with a mean of 33.36 per cent.; the cloudiest month was February, mean 51.78 per cent. The percentage of cloudiness at 7 A. M. was 47.69; at 2 P. M., 49.56; at 9 P. M., 34.21.

DIRECTION OF THE WIND.

During the year, three observations daily, the wind was from the N.W. 290 times, S.W. 213 times, S. E. 198 times, N. E. 168 times, S. 113 times, N. 46 times, E. 43 times, W. 24 times. The south winds (including southwest, south and southeast) outnumbered the north (including northwest, north and northeast) in the ratio of 524 to 504.

VELOCITY OF THE WIND.

The number of miles traveled by the wind during the year was 120,230, which is 15,222 miles below the average for the preceding 16 years. This gives a mean daily velocity of 329.4 miles, and a mean hourly velocity of 13.73 miles. The highest velocity was 84 miles an hour, on August 12th, from 5:43 to 5:58 P. M.; the highest daily velocity was 1,030 miles, on the 29th of December; the highest monthly velocity was 13,380 miles, in May. The windiest months were May and December; the calmest months were June and July. The average velocity at 7 A. M. was 12.75 miles; at 2 P. M., 13.39 miles; at 9 P. M., 13.77 miles.

BAROMETER.

Mean height of barometer column, 29.125 inches, which is .018 inch above the annual average. Mean at 7 A. M., 29.145 inches; at 2 P. M., 29.107 inches; at 9 P. M., 29.121 inches. Maximum, 29.948 inches, February 23d; minimum, 28.415 inches, January 16th; yearly range, 1.533 inches. The highest monthly mean was 29.244 inches, in February; the lowest was 29.020 inches, in May. The barometer observations are corrected for temperature and instrumental error only.

RELATIVE HUMIDITY.

The average atmospheric humidity for the year was 73.2; at 7 A. M., 82.1; at 2 P. M., 59.5; at 9 P. M., 78. The dampest month was September, with mean humidity 78.6; the driest month was April, mean humidity 61. There were 28 fogs during the year, which number has been but once equaled—in 1884. The lowest humidity for any single observation was 6 per cent., on November 6th.

The following tables give the mean temperature, the extremes of temperature, the number of inches of rain and snow, the number of rainy days, the number of thunder showers, the mean cloudiness, the relative humidity, the number of fogs, the velocity of the wind, and the mean and extreme barometer heights for each month of the year 1889, and a comparison with each of the 21 preceding years:

YEAR 1889.

Months.	Mean temp....	Max. temp....	Min. temp....	Rain, inches..	Snow, inches..	Rainy days...	Thun. storms..	Mean cloudi-ness.....	Limiting	No. of fogs....	Miles of wind,	Mean barom...	Mic. barom...	Min. barom...
January....	30.31	49.0	7.0	0.79	0	2	0	37.31	77.5	8	11,620	29.148	29.477	28.415
February...	27.56	65.0	-3.5	2.20	6	6	0	51.78	76.0	3	11,020	29.244	29.948	28.570
March.....	44.73	71.0	22.0	2.30	0	7	2	42.80	69.4	1	11,110	29.127	29.539	28.600
April.....	56.37	86.0	35.0	2.52	0	8	5	44.16	61.0	0	11,550	29.095	29.496	28.551
May.....	64.23	89.0	38.0	8.27	0	14	8	48.47	68.9	0	13,380	29.020	29.394	28.617
June.....	71.24	90.0	51.5	4.04	0	7	7	39.56	73.3	2	6,860	29.061	29.401	28.664
July.....	76.00	94.0	56.0	6.34	0	10	5	45.05	75.5	0	7,070	29.052	29.264	28.545
August.....	72.69	89.0	57.0	8.38	0	7	6	33.36	78.1	2	7,840	29.154	29.469	28.970
September...	63.17	89.0	38.0	5.02	0	9	0	42.06	78.6	3	8,830	29.101	29.555	28.836
October.....	53.56	89.0	31.0	2.09	0	6	2	49.25	72.2	4	8,510	29.178	29.525	28.771
November...	38.25	65.0	11.0	1.96	0	3	0	44.18	71.9	0	10,060	29.208	29.705	28.602
December...	44.78	72.0	11.0	0.08	0	2	0	47.89	76.3	5	12,380	29.110	29.679	28.429
Mean	53.57	79.0	29.5	3.66	0.5	7	3	43.82	73.2	2	10,020	29.125	29.536	28.673

TWENTY-TWO YEARS: 1868-1889.

Year.	Mean temperature....	Maximum temperature....	Minimum temperature....	Hot days (above 90°).....	Zero days.....	Days between severe frosts....	Rain—Inches....	Snow—Inches....	Rainy days.....	Thunder storms.	Mean cloudiness.....	Limiting	No. of fogs.....	Miles of wind....	Mean barometer
1868...	52.77	101.0	-16.5	43	7	160	37.48	27.5	77		42.35				
1869...	50.51	96.0	-5.0	23	2	167	38.51	18.0	105	33	49.23	78.2	19		29.103
1870...	53.70	102.0	-10.0	51	6	197	31.32	9.5	100	27	47.88	68.4	13		29.097
1871...	53.56	103.0	-6.0	48	8	218	33.23	29.7	120	24	47.37	65.9	6		29.076
1872...	51.30	97.0	-13.0	45	16	192	32.63	23.2	116	40	44.33	64.4	11		29.112
1873...	51.96	104.0	-26.0	48	9	165	32.94	26.5	101	17	42.46	64.0	6	154,508	29.093
1874...	53.63	108.0	-3.0	58	2	187	28.87	43.0	99	20	45.54	65.7	14	145,865	29.121
1875...	50.63	99.0	-16.5	32	12	196	28.87	5.0	106	21	44.81	66.7	5	145,816	29.102
1876...	52.76	98.0	-5.0	36	4	179	44.18	25.7	102	29	41.27	66.8	4	148,120	29.102
1877...	54.16	99.0	-9.0	20	3	217	41.09	15.5	126	39	47.12	72.6	11	113,967	29.117
1878...	55.31	98.0	-6.0	35	7	228	38.89	25.5	107	33	40.65	70.2	5	125,793	29.067
1879...	54.63	99.5	-16.0	48	13	203	32.63	10.3	90	36	40.01	67.1	10	124,768	29.127
1880...	54.00	101.0	-12.0	41	2	211	32.65	7.0	89	29	40.15	67.9	18	146,089	29.123
1881...	54.65	104.0	-8.0	63	6	210	33.27	32.5	110	31	47.42	70.1	11	141,430	29.108
1882...	54.94	105.0	-6.5	40	1	232	27.60	18.0	102	26	45.41	68.6	14	137,736	29.113
1883...	51.66	96.5	-14.0	26	8	217	40.65	12.5	106	32	45.24	69.7	18	141,164	29.135
1884...	51.30	98.0	-21.5	20	14	193	43.45	29.0	105	35	47.56	72.6	28	131,188	29.111
1885...	51.01	96.0	-14.5	27	21	176	36.97	33.0	103	31	44.57	71.3	9	125,013	29.107
1886...	52.96	105.0	-18.0	53	16	203	24.25	23.5	103	28	39.64	66.5	5	127,769	29.111
1887...	53.12	102.0	-20.0	40	16	203	33.84	25.0	91	23	40.91	69.8	13	132,367	29.109
1888...	52.28	99.0	-18.0	28	9	203	44.17	22.0	83	17	42.49	72.2	15	128,186	29.132
1889...	53.57	94.0	-3.5	6	4	213	43.99	6.0	81	35	43.82	73.2	28	120,230	29.125
Mean	52.28	100.2	-12.4	39	9	199	35.50	21.3	101	29	44.11	69.2	13	134,556	29.109